

## Glenn aids NASA's fuel cell advancements

Glenn is leading the effort to take advancements in fuel cell power generation technology—originally developed for NASA missions—to the next level. The extensive commercial development of the proton-exchange-membrane (PEM) fuel cell technology

for automotive and residential applications is now being leveraged to advance its use as a power source for space transportation applications.

An electrochemical device, a fuel cell combines hydrogen and oxygen to

produce electrical power, with water as its only by-product. Alkaline fuel cells, a similar technology to PEM fuel cells, are the primary source of electrical power on the space shuttle orbiter. Although reliable, alkaline fuel cells are a costly and aging technology with no large-scale commercial applications. The advantages of PEM technology over alkaline technology are numerous—higher power, lower weight, increased safety, longer life, improved reliability, improved operability, and lower cost.

## NASA comes together through SBIR

BY DOREEN B. ZUDELL

*This is the third in a series of articles that feature an employee from each NASA center who has a "One NASA" story to share.*

When Walter Kim talks about the way NASA's Small Business Innovation Research (SBIR) Program operates, the phrase *E Pluribus Unum—Out of many, one—comes to mind.*

"While each NASA center has its unique capability and technical expertise, we all follow the same process under the SBIR Program," explained Kim, Glenn's SBIR program manager in the Commercial Technology Office. "The process involves Headquarters and all NASA centers working across the six strategic enterprises for one common goal."

Congress established the SBIR Program in 1982 to ensure that the best and most innovative concepts become part of Federal research and development efforts that benefit the Nation.



C-2003-781

Photo by Quentin Schwinn

*Glenn's SBIR Manager Walter Kim, left, and Chief of Power and Propulsion Office Sandra Reeherst hold Hall thrusters, a technology area where NASA's SBIR has contributed to improvements in electric propulsion for space applications.*

The Space Transportation Project Office at Glenn is managing the PEM fuel cell development effort for the Vehicle Systems Research and Technology Project under the Next Generation Launch Technology Program. The Electrochemistry Branch of the Power and On-Board Propulsion Technology Division is leading the technical effort, in partnership with Johnson, Kennedy, and Marshall.

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# NASA announces new shuttle manager

Headquarters release

NASA has selected William "Bill" W. Parsons as the new manager for the Space Shuttle Program. Parsons, the director of NASA Stennis, succeeds Ronald D. Dittmore, who announced his resignation April 23 after serving more than 4 years in the position.



Dittmore



Parsons

Parsons joined the NASA team at Kennedy in 1990. There he served as launch site support manager in the Shuttle Operations Directorate, an executive management intern, the shuttle flow director in the Shuttle Operations Directorate, and in 1996, became manager of the Space Station Hardware Integration Office.

Parsons became Stennis center director in August 2002. He was first assigned to Stennis as the chief of operations of the Propulsion Test Directorate in 1997. Later, he relocated to Johnson to become the director of the Center Operations Directorate and then became Johnson's deputy director. He returned to Stennis in 2001 to serve as director of the Center Operations and Support Directorate prior to his appointment as center director.

"I welcome the opportunity to work with Bill. He knows the spaceflight family and he knows the Space Shuttle Program," said Michael C. Kostelnik, deputy administrator for the International Space Station and Space Shuttle programs at Headquarters in Washington. "NASA is about the people who fly, fix, maintain, and design our vehicles, and I know we've found a terrific leader to help guide the team through this difficult time."

Kostelnik also praised Dittmore's dedication and professionalism over the past 25 years and noted his integral role in helping to create many of the processes and procedures followed in today's Space Shuttle Program.

For information about NASA, the Space Shuttle Program, and spaceflight, visit <http://www.nasa.gov> or <http://www.spaceflight.nasa.gov>. ♦

# Web site addresses "Steps to Green"

Headquarters release

NASA's new Web site for the President's Management Agenda (PMA), "Steps to Green," is now available at <http://www.hq.nasa.gov/office/codea/pma>. "Steps to Green" features messages from NASA Administrator Sean O'Keefe and NASA Deputy Administrator Fred Gregory, NASA's "Action Plan for Implementing PMA and Status" from each of five NASA "champions" (as of March 31), and much more.



PMA is a bold strategy for improving the management and performance of the Federal Government. The Agenda contains

five core strategic management initiatives to improve Federal management and deliver results that matter to the American people: Strategic Management for Human Capital, Competitive Sourcing, Improved Financial Performance, Expanded Electronic Government, and Budget and Performance Integration. ♦

# What happens to the brain in space?

Headquarters release

NASA's "The Neurolab Spacelab Mission: Neuroscience Research in Space," documents the results of a 16-day space shuttle mission dedicated to studying how weightlessness affects the brain and nervous system.

The seven-person crew of Shuttle *Columbia* STS-90 mission (and two alternate crewmembers on the ground) worked with 26 experiments during the June 1998 Neurolab mission. The experiments are organized into five

research areas and include a brief introduction and detailed color illustrations.

Commentary and summaries are designed to be accessible to general scientific readers, but also include detailed descriptions and references, which offer researchers opportunities for additional study. Orders can be placed at <http://bookstore.gpo.gov/>. ♦



Astronaut Richard Linnehan in the Neurolab of the Earth-orbiting Space Shuttle *Columbia* wears a sleep cap that monitors and measures electrical impulses from the brain, muscles, eyes, and heart.

# SBIR operates under One NASA philosophy

Continued from page 1

Under the program, NASA field centers identify critical technologies that are needed to enhance the Agency's ability to meet mission goals. Once those needs are established, companies submit proposals explaining how their innovations would support NASA's mission and how they plan to pursue commercial applications for their products. SBIR companies then develop and commercialize their innovations through a three-phase process.

"The center(s) who collaborate with these small businesses are chosen solely for their technical expertise," Kim explained. "Operating under this One NASA philosophy through the years has required the cross-center team to consider all decisions within the context of what is best for the Agency rather than for any one center."

Kim stressed the value of strong communication among SBIR managers throughout the centers. Managers meet monthly through videoconferences and attend semiannual program management gatherings, where they invite personnel involved in the SBIR process.

"Many people within and throughout the centers play a vital role in the SBIR process," Kim said. "In fact, more than half of NASA's yearly procurement activities are SBIR-related, and Glenn has oversight for all Agency SBIR procurement policies and guidelines."

Fiscal year 2002 ended with another successful season for the SBIR Program. NASA awarded more than 450 Phase I (feasibility and technical merit), Phase II (promising development), and Phase III (commercialization) contracts. Kim noted that throughout the years, SBIR companies have worked with several centers on portions of the same contract.

ViGYAN, Inc., Hampton, VA, for example, developed the Federal Aviation Administration-certified Pilot Weather Advisor system using satellite technology to substantially increase the amount of weather

information available to aircraft pilots in flight. Phase I and II, funded by Langley Research Center, resulted in the development and patent of the original system concept. Phase III, funded by Glenn, developed and demonstrated an affordable, commercially viable satellite data link system for the dissemination of weather information. The Phase III effort led to a spinoff company, WeatherStream, which has since been acquired by Weather Services International, Inc.

Kim, who began his career at Glenn as a researcher in 1979, is proud to be part of the SBIR Program. "I feel that I'm making a contribution to the Agency

and to small businesses by helping to find a place for technological innovation," explained Kim, who received NASA's Exceptional Achievement Medal for outstanding leadership of the SBIR Program and in the area of technology transfer and commercialization in 1996.

Working in the SBIR Program for the past 13 years, Kim has gotten to know and respect his colleagues throughout all NASA centers. He sees the program as a prime example of how cooperation and collaboration breed success.

Kim affirmed, "We all have our roles, but come together as one." ♦



## NASA Family Assistance Fund

NASA Administrator Sean O'Keefe has announced the formation of the NASA Family Assistance Fund. The fund was created in response to the numerous requests of Agency employees to support the families of STS-107 and other NASA families during their times of need.

Formed in cooperation with the Federal Employee Education and Assistance Fund (FEEA), the NASA Family Assistance Fund will provide need-based financial assistance and educational assistance to the families of the seven *Columbia* astronauts, as well as to other families of NASA personnel who die as the result of personal injuries suffered in the performance of their official duties. The money collected will be used to satisfy current expenses, with the primary goal of guaranteeing the educational needs of children of these NASA personnel. NASA employees, if they choose, may designate their contribution for all the *Columbia* families, for a particular *Columbia* family member, or for some other NASA family member.

Employees interested in donating to the NASA Family Assistance Fund may do so in several ways: online by visiting [http://www.nasa.gov/about/overview/AN\\_FAF.html](http://www.nasa.gov/about/overview/AN_FAF.html); by telephone to the FEEA at 303-933-7580 or 800-338-0755; or by mailing checks to FEEA NASA FUND, 8441 W. Bowles Avenue, Suite 200, Littleton, CO 80123-9501. ♦



## Eye on Ohio

Glenn hosted nearly 130 vision experts and state and federal officials who participated in the "Ohio's Vision . . . Awaken to the Challenge" conference held April 28 at OAI. Jonathan B. Clark, MD, Space Medicine and Health Care Systems at NASA Johnson, was the keynote speaker. The event was organized by Prevent Blindness Ohio and Glenn's Dr. Rafat Ansari (6700), renown for his work in the area of space-based technology to preserve sight. Workshops and panel discussion focused on the increase of challenges for aging eyes and avenues for collaboration to expand the scope of vision research conducted in Ohio. Pictured is Sherry Williams, chief executive officer of Prevent Blindness Ohio, with Ansari at the conference.



C-2003-799

Photo by Marvin Smith



Photo by John Lucero

## Children at work

Glenn was all abuzz on April 24 with activities designed to encourage the participation of children and adults throughout the day. The annual Take Our Children to Work Day program, sponsored by the Office of Equal Opportunity Programs and the Women's Advisory Group, drew over 500 children for a resounding success. Following the speech and awe-inspiring performance of Gary "Boomerang Man" Broadbent, children spent a few hours shadowing a family member in the workplace. After lunch, guests could visit one or two of 11 tour sites for an up-close look at Glenn's unique facilities and learn from the talented workforce. Pictured, left, is Karl Bergquist (7410) in the Fab Shop demonstrating stereolithography rapid prototyping, a process that turns liquid resin into a solid model using ultraviolet lasers.

## Hot stuff

Many employees were tempted by the exotic chili recipes available at the second annual Great American Chili Cook-off on April 24 in the upper section of the Main Cafeteria. Six unique chili recipes included John Hairston's (9000) "Wild Thang" with venison; Linda Dukes-Campbell's (9300) "Great White" with turkey; Christine Paniagua's (QSS) "Darn You to Heck" with steak; Laurie Yost's (7160) "Sweet Willy's" with salsa; Anna Falcon's (9000) "Carlos' Creative Chili," and Greg Bobbitt's (9000) "Bomb House," both with ground beef. Proceeds from the price of admission went to Glenn's Harvest for Hunger 2003 campaign, which included donations of 946 pounds of nonperishable food, plus \$1280.83 in checks and cash (\$1 = four pounds of food) for a total of 6069.32 pounds of food. Pictured, left to right behind table, Vanessa Webb (0100), Paige Bobbitt, and Greg Bobbitt (IDI/9000), Glenn's Harvest for Hunger chairman.



Photo by S. Jenise Veris

C-2003-786

Photo by Quentin Schwinn



## Drop days

Glenn held its annual DIME (Dropping In a Microgravity Environment) Drop Days, April 29 through May 1. The four winning teams came from Sycamore High School, Cincinnati, OH; Gettysburg Area High School, Gettysburg, PA; Troy Athens High School, Troy, MI; and Cleveland Heights High School, Cleveland Heights, OH. Student teams conducted preliminary drops in the 2.2-Second Drop Facility and worked with their mentors to prepare to drop their experiments during a live Web cast the next day. The students and sponsors also participated in microgravity workshops, toured several facilities, and experienced a Self-Contained Underwater Breathing Apparatus diving lesson at their hotel pool. Astronaut Don Thomas spoke with the students and awarded their DIME certificates. Pictured, left to right, are Advisor Al DeGennaro, and Cleveland Heights High School students Crystal Terrance, Krystle Hawkins (hidden), and Samuel Jenkins.



## Director's Corner

With Donald Campbell

### A tradition of excellence

When we hear the name Dr. Abe Silverstein, we think of a dynamic individual whose technical leadership shaped NASA's early years—both at the Headquarters and center levels. Dr. Silverstein was responsible for the conception, design, and construction of our Nation's first supersonic wind tunnels devoted to propulsion research.

Steven Szabo, Jr., is another name that sparks respect. As Director of Engineering at the Center from 1986 to 1993, he epitomized excellence in engineering and mentored many employees who have gone on to achieve technical merit.

Because of the significant contributions of these two men, the awards recently announced in their names, the Abe Silverstein Medal and the Steven V. Szabo Engineering Excellence award, carry high esteem at this Center. As do the Craftsmanship awards, which spotlight a critical segment of Glenn's highly skilled

workforce—model makers, machinists, and electrical and electronics technicians—who are a vital link between an engineer's vision and the hardware needed to meet mission goals.

Those who have received these prestigious awards, this year and in the past, should take great pride in knowing that their accomplishments continue a tradition of excellence. ♦

*Special note:* In my May *Director's Corner* I talked about the launch of the SIRTf (Space Infrared Telescope Facility). Unfortunately, there was not enough time to replace a failed motor on the Boeing Delta II rocket prior to its scheduled launch on April 27. Therefore, as a result of the upcoming Mars Exploration Rovers (MER) missions, also scheduled to launch on Delta II rockets, NASA managers decided to postpone SIRTf's launch until no earlier than mid-August 2003.

## News and Events

### Air Power 2003

Glenn showcased NASA's contributions to air-powered propulsion through a well-attended exhibit at Air Power 2003, May 10 and 11, at Wright-Patterson Air Force Base (WPAFB), Dayton, OH. The displays included a dramatic timeline of NASA's history of improvements to airplanes from 1915 to the present; pictorial displays of collaboration between Glenn and WPAFB over the last 60 years; an interactive Wright Flyer vision simulator; a 20- by 20-foot inflatable space shuttle; the Aero Bus with NASA movie clips; and the Office of Biological and Physical Research's popular photo opportunity to be pictured as an astronaut.



Photo by Doreen Zudell

### Troop support

In an effort to "Honor Those Who Serve," Glenn's Veterans Awareness Committee (VAC) offered patriotic items such as pins, badges, and ribbons for purchase on April 21 and 28. Proceeds from the sale were donated to the USO (United Services Organization) for use towards various programs that support troops stationed around the world, and their families. A wall in the Employee Center has been reserved to honor Glenn employees and/or members of their families who are in active or reserve military status. Pictured is Bill Saettel (9400), veteran and VAC member.



Photo by Bill Saettel



# Glenn and Wright-Patterson share mutual history of flight

*The Wright Brothers began the evolution of powered, manned flight in Dayton, OH. Since then, improvements have been made in increased flight speed, capacity, economy, fuel usage and efficiency, cost, and noise reduction in aircraft systems. In particular, propulsion system development has played a key role in the aeronautical evolution.*

Over the past six decades, NASA Glenn and Wright-Patterson Air Force Base (WPAFB) in Dayton have worked collaboratively on a multitude of aerospace-related projects, producing countless innovations in civil and military aviation.

When NASA's predecessor, the National Advisory Committee for Aeronautics (NACA), opened the Aircraft Engine Research Laboratory (AERL) in Cleveland in 1942, considerable research was dedicated to developing this Nation's aircraft engine research program. Radial piston engines, in which propellers create a jet of air that rushes backward to drive the aircraft forward, were developed at the AERL. Some of the most notable models were the R2600 and R3500, which were refined by WPAFB for use in the military during World War II. The AERL was responsible for research on the 3000 hp R4360, the largest piston engine of WWII. The AERL was also involved in early research on jet propulsion for commercial aircraft.

Efforts to improve technology in jet engine fuel efficiency continued throughout the 1940s, as NACA and WPAFB began what would be a rich heritage of collaboration. Ramjet technology, which also began in the 1940s, was advanced greatly in the 1950s, when NACA became NASA. Ramjets, known as the "flying stovepipes," are alternatives to turbine engine propulsion for high-speed flight.

Glenn's Center Director, Donald Campbell, began his government career as a test engineer for gas turbine engines and engine components in the Aero-propulsion Laboratory at WPAFB.

"As program director and Propulsion and Power Laboratory director at Wright-Patterson and now as Center Director here at Glenn, I continue to find considerable synergy and collaborative opportunities for research and technology among the two organizations," Campbell said. "Bringing Wright-Patterson AFB and Glenn Research Center propulsion research programs together has been extremely fulfilling."

"Over my entire career at WPAFB, I worked with Lewis/Glenn on collaborative propulsion research, including the Full Scale Engine Research Program in the early 1970s, small turbine engine programs, and the high-speed propulsion systems for the National AeroSpace Plane. It has been a true partnership. The joint research has made, and continues to make, significant contributions in aircraft propulsion, both civil and military."

As a member of the WPAFB staff in the early 1970s, Tom Benson, Engine Systems Technology Branch, experienced first hand the value of the WPAFB-NASA partnership.

"Those were exciting times," Benson recalled. "While working with the Air Force on the F16 inlet, I traveled to Glenn (Lewis) to monitor a test in the 8- by 6-Foot Wind Tunnel." Benson left WPAFB in 1975 to work on a Ph.D., which brought him to Glenn in 1978. In the early 1990s, as a member of the Glenn staff, Benson renewed WPAFB friendships through collaborative work on the National AeroSpace Plane.



*This 1943 photo shows a representative from Wright Aeronautical instructing AERL staff on the principles of the radial engine. NASA and WPAFB collaborated on many tasks to produce aircraft engines for the war effort.*

Dr. Randy Chriss, Turbomachinery and Propulsion Systems Division, can attest to the sharing of technology that takes place between the Dayton and Cleveland bases. From 1994 to 1999, Chriss served a detail at WPAFB, working in the area of computational fluid dynamics.

"As a liaison between NASA and the Air Force, I learned the value of building relationships with the WPAFB staff," Chriss explained. "True collaboration takes place when trust is established through knowledge and professionalism."

One of the most notable Glenn and WPAFB collaborations is the Integrated High Performance Turbine Engine Technology (IHPTET) Program. This program, which began in 1988 under Campbell's oversight in the Propulsion and Power Laboratory at WPAFB and continues today, is directed toward doubling the thrust-to-weight ratio of advanced military turbine engines. A companion program, the Versatile Affordable Advanced Turbine Engine Technology (VAATE) Program, is in its early stages of implementation. Dr. Hugh Gray, chief of the Materials Division, and Dr. Joe Shaw, manager of the Ultra-Efficient Engine Technology (UEET) Program, both serve on the IHPTET and VAATE steering committees.

Continued on page 10

# Glenn awards recognize skill and ingenuity

BY S. JENISE VERIS

Glenn's workforce is a diverse mixture not only of people and cultures but also of knowledge and skills. The recent presentation of three awards—the Craftsmanship Award, the Steven V. Szabo Award, and the Abe Silverstein Medal—recognized researchers, engineers, and craftsmen for their significant contributions to NASA's missions and goals.

The Craftsmanship Award honors a critical segment of Glenn's highly skilled workforce—model makers, machinists, and electrical and electronics technicians—who have fabricated a component or system that required a high degree of skill and imagination; devised a unique manufacturing process; or overcome job difficulties such as a lack of information due to the highly technical and experimental nature of a project.

**Nicholas Varaljay**, an electronics technician in the Test Installations Division, is the 2003 Craftsmanship Award winner for assembly and buildup of the first MEMS (microelectromechanical systems) microwave cantilever switch at Glenn. His work is a culmination of years of MEMS process development, which may ultimately lead to an entirely new generation of solid-state, microwave-based phased-array antennas to transform the communications industry.

**Robert Reminder**, a mechanical engineering technician in the Manufacturing Engineering Division, won the Craftsmanship Award for manufacturing an advanced mold process to accurately duplicate ice formation. Using advanced aerospace composite and silicon molding, Reminder has painstakingly reproduced the large and complex ice shapes to create models that are critical to Glenn's cutting-edge icing research, and aviation safety worldwide.

The High Flow Jet Exit Rig Design Team won Glenn's most prestigious engineering award honoring the memory of Steven V. Szabo, Jr., the Center's director

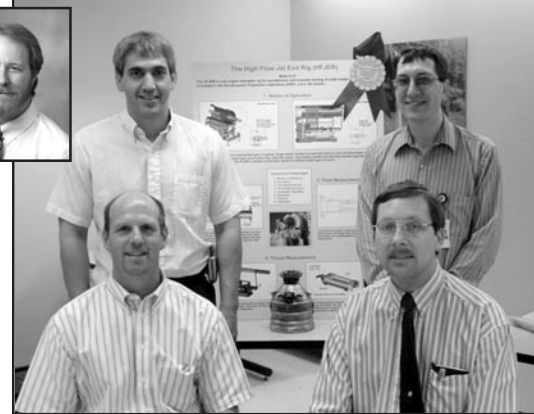
of Engineering from 1986 to 1993. The Szabo award recognizes a current and specific contribution resulting in an engineering application that significantly helped solve an important or difficult problem.

A team of three engineers, **Robert Buehrle**, **Paul Solano**, and **Paul Trimarchi** of the Engineering Design and Analysis Division, and two researchers, **Dr. James Bridges**, Structures and Acoustics Division, and **John Wolter**, Turbomachinery and Propulsion Systems Division, designed and developed an innovative jet engine nozzle test rig. The rig, in combination with the Aeroacoustic Propulsion Laboratory's true far-field acoustic measurement capabilities and Mach 0.35 free jet, creates a testing environment unparalleled in government and industry. Its design enables unprecedented internal acoustic attenuation and allows for thrust and flow measurement within  $\pm 0.25$  percent, while accommodating the significant thermal expansion that results from high test temperature gradients.

**Dr. Rafat Ansari**, biofluid sensor systems scientist in Glenn's Microgravity Science Division, was awarded the Abe Silverstein Medal that commemorates the long and fruitful career of the renown former center director who served from 1961 to 1969.

Ansari won for developing a novel fiber-optic probe for measuring nanometer-size particles suspended in liquids based on a technique called dynamic light scattering. This technique has been successfully applied to non-invasively detect cataracts and other diseases of the eye at a much earlier stage than possible by any clinical or laboratory method.

Demonstrated success in clinical settings, such as the National Institutes of Health and the Food and Drug Administration,



The High Flow Jet Exit Rig design team who won the 2003 Szabo Award, include, clockwise, Paul Trimarchi, John Wolter, Bob Buehrle, and Paul Solano. Dr. James Bridges is inset.



Robert Reminder is the 2003 Craftsmanship Award winner for manufacturing.



Nicholas Varaljay is the 2003 Craftsmanship Award winner for assembly and buildup.

Dr. Rafat Ansari is the 2003 Abe Silverstein Medal winner.



Photos by Julie A. Barker

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Center Director Donald Campbell welcomed a capacity crowd at the 2003 Support Assistant and Clerical Award reception honoring this year's awards recipients. During the reception, Campbell lauded 12 civil servants and support service contractors for their dedication and outstanding work. A lighthearted teaming activity, lead by Deputy Director Dr. Julian Earls, and a spectacular display of refreshments added to the fanfare.

The Support Assistant and Clerical Award is the only Glenn award that invites Centerwide participation. Any employee can submit a nomination to the selection committee based on his or her observation of outstanding performance by a support assistant or clerical employee. The award consists of a cash prize and Certificate of Achievement. This year's recipients include the following employees:

**Karen Ault** is the legal clerk for the attorneys in the Office of Chief Counsel. She began her career at the Center 9 years ago.

**Stephanie Black** is the management support assistant for the Microgravity Science Division. She began her career at the Center 28 years ago.

**Stephanie Brown-Houston** is the management support assistant in the Systems Management Office. She is currently serving her 4<sup>th</sup> year as a civil servant in a career that spans 18 years at the Center.

**Lisa Lapka**, InDyne, Inc., provides clerical support to the Aviation Environments Technical and Aviation Environments Test Engineering branches in the Research Testing Division. She has been employed at the Center for 3 years.

**Ethel McLaughlin** is a human resources assistant for the Office of Human Resources and Workforce Planning. She is currently serving her 4<sup>th</sup> year as a civil servant preceded by 1 year supporting Center operations as an Omni contract employee.

**Marilyn Mosby**, InDyne, Inc., provides clerical support to the Communications Technology Division. She has been employed at the Center for nearly 18 years.

**Judith Osborne**, InDyne, Inc., provides clerical support to the Calibrations Laboratory in the Logistics and Technical Information Division. She has worked at the Center for 14 years.

**Belinda Seljan**, InDyne, Inc., provides clerical support to the Aero Electronic Test, Wind Tunnel Test Engineering and Aero Support branches. She has been employed at the Center for 2 1/2 years.

**Shaun Stafford** is a management support assistant for the Office of Human Resources and Workforce Planning. She began her career at the Center 2 1/2 years ago.

**Judith Zalewski**, InDyne, Inc., provides clerical support to the Imaging Technology Center in the Logistics and Technical Information Division. She has been employed at the Center for 13 years.

Continued on next page



*Ault*



*Black*



*Brown-Houston*



*Lapka*



*McLaughlin*



*Mosby*





Osborne



Seljan



Stafford



Zalewski

Continued from page 8

**Terry Zarrelli** (not pictured) is the management support assistant for the Power and Propulsion Office. She began her career at the Center 27 years ago.

**Lesha Zvosec**, InDyne, Inc., provides clerical support to the Space Communications and Spectrum Management Office. She has worked at the Center for 13 years. ♦



Zvosec

## Adapting PEM fuel cell technology

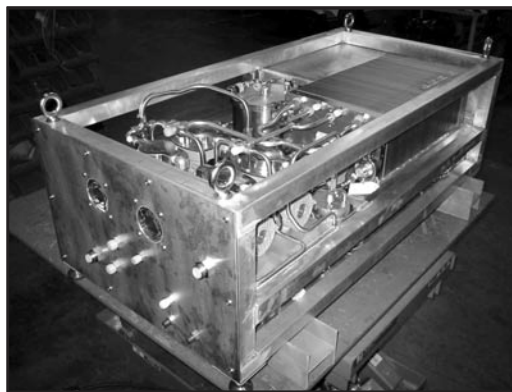
Continued from page 1

"Having emerged as the leading fuel cell technology for near-term commercial uses, PEM fuel cells are suitable for a variety of space applications as well," said Mark Hoberecht, Electrochemistry Branch. "NASA recognizes the valuable attributes of PEM fuel cells, and is partnering with commercial vendors to adapt this technology for future launch vehicles. The Orbital Space Plane Program, for example, has expressed an interest in applying this technology to supply power needed to meet its crew return and crew transfer requirements."

Under contract to Glenn, ElectroChem, Inc., of Woburn, MA, and Teledyne Energy Systems, Inc., of Hunt Valley, MD, recently delivered breadboard PEM fuel cell power plants to NASA Johnson for testing to verify performance, endurance, and operational capabilities. Delivery of the breadboard hardware is the result of 16-month contracts that Glenn awarded to both vendors in December 2001 for the design, fabrication, assembly, and testing of breadboard power plants at the 1- to 5-kW power level. ElectroChem delivered a 1-kW PEM fuel cell power plant, and Teledyne, a 5-kW PEM fuel cell power plant.

At the conclusion of the testing, Glenn may award one or both vendors optional contract tasks to design, assemble, and test higher fidelity engineering model PEM fuel cell power plants as the next step in developing this technology for future spaceflight missions. Current plans include testing the engineering model(s) in the new Glenn Fuel Cell Test Facility currently under construction. ♦

*Pictured is a 5-kW breadboard PEM fuel cell power plant from Teledyne Energy Systems, Inc.*



## Changes in retiree entry to Lab

In compliance with Headquarters' direction, and security requirements "for a Nation at war," Glenn has implemented new procedures for facilitating the access of NASA retirees. These procedures provide retirees with expedited service at the Main Gate and freedom to use public facilities during duty hours.

Under the new guidelines, NASA retirees wishing to come on Lab must enter through the Main Gate, sign-in, and be issued a Visitor Badge. Glenn retirees, who present a retiree badge at the Glenn Badge Office, will be issued a new NASA Retiree Identification Card that contains the bearer's photograph and signature. This card will enable retirees to move to the head of the line at Visitor Control and receive a Visitor Badge, which provides access to the Century Federal Credit Union, the Visitor Center, and the Employee Fitness Center.

Retirees wishing to visit Glenn offices and workareas are required to have a sponsor and escort. Multi-day visitor badges are available, which permit the retiree to enter either gate during the week in which the badge is issued.

Special procedures may apply to prescheduled retiree functions such as picnics, Guerin House functions, and similar events in order to facilitate access and movement.

A more detailed explanation of these procedures is available at the Main Gate visitor area. ♦

Visit **AeroSpace Frontiers** online at  
<http://AeroSpaceFrontiers.grc.nasa.gov>

## People

### Appointments

Dr. George Baaklini has been named chief of the Optical Instrumentation Technology Branch, Instrumentation and Controls Division. He came to Glenn in 1987 after working at Cleveland State University as a research associate. Baaklini is an internationally recognized expert in nondestructive evaluation and has been a pioneer in developing rotating engine propulsion health screening. He has authored and edited several technical publications and has earned numerous professional awards. His strong technical background and ability to lead large complex teams are important assets for the division and the Center.

Robert Plencner has been named chief of the Airbreathing Systems Analysis Office. Plencner has over 25 years of technical, leadership, and managerial experience in the area of air-breathing propulsion systems and analysis and engine system integration. He previously worked as an aerospace engineer, team leader, and acting supervisor in the Aeropropulsion Analysis Office, and as project manager of Engine System Integration for the High-Speed Research and Ultra-Efficient Engine Technology programs.



*Dr. Baaklini*



*Plencner*

### Honors

Robert Solomon, Computational Environments Branch, was recently inducted into the North Ridgeville High School distinguished Alumni Hall of Fame. Valedictorian of the high school's class of 1961, Solomon was chosen for this honor because of his professional accomplishments and community involvement. He was inducted during the school's annual Honors Reception, which recognizes 9<sup>th</sup>- through 12<sup>th</sup>-grade students who have a 3.3 or higher grade point average after three grading periods.



*Solomon*

### Retirements



*Dittmar*



*Halloran*



*Mehmed*



*Murray*

**Dr. James Dittmar**, Structures and Acoustics Division, retired on April 3, 2003, with 35 1/2 years of NASA service.

**John Halloran**, Materials Division, retired on July 3, 2002, with 45 years of NASA service.

**Oral Mehmed**, Structures and Acoustics Division, retired on January 3, 2003, with 41 years of NASA service.

**Peter Murray**, Manufacturing Engineering Division, retired on April 1, 2003, with 36 years of NASA service.

## Glenn and WPAFB advance aircraft

Continued from page 6

"Glenn has worked extensively with WPAFB in the materials area," Gray said. "This partnership has resulted in significant progress in the development and implementation of advanced titanium aluminide components, superalloy disks, ceramic matrix composites, polymer matrix composites, and high-temperature environmental and thermal barrier coatings."

On May 10 and 11, Glenn proudly highlighted some of its joint research through a large exhibit at Air Power 2003, WPAFB's open house. (See page 5.)

Collaborative efforts to advance such technology as engine efficiency, lithium-ion batteries, and computational fluid dynamics—to name a few—ensure the continuation of the longstanding partnership between Glenn and WPAFB into the 21<sup>st</sup> century and beyond.

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**DEADLINES:** News items and brief announcements for publication in the July issue must be received by noon, June 13. The deadline for the August issue is noon, July 11. Submit contributions to the editor via e-mail, doreen.zudell@grc.nasa.gov, fax 216-433-8143, phone 216-433-5317 or 216-433-2888, or MS 3-11. Ideas for news stories are welcome but will be published as space allows. View us online at <http://AeroSpaceFrontiers.grc.nasa.gov>.





## News Notes

**LESA MEETING:** LESA/IPFTE, Local 28, will hold its next monthly membership meeting on Wednesday, June 11, at noon in the Employee Center,

**HIPPENSTEELE RETIREMENT:** Sandy and Steve Hippensteele are retiring, so mark your calendar for Friday, June 20, from 2 to 4 p.m. in the to wish them well and enjoy cake and coffee.

**RETIREE LUNCHEON:** On the third Wednesday of each month a retiree luncheon is held on the east side of Cleveland. The next meeting is June 18 at noon at the

For more information, contact Jack Heller, 216-464-9233.

**AMATEUR RADIO FIELD DAY:** The NASA Glenn Amateur Radio Club invites all to stop by and visit their Annual Field Day activity. This 24-hour annual event provides an opportunity for "hams" to fine-tune emergency communication skills. It runs from 2 p.m., Saturday, June 28 through 2 p.m., June 29 at the

All are welcome to stop by and see various modes of amateur radio communications in operation, including using voice, Morse code, radioteletype, and various types of antenna setups. For more information, contact Nancy, KC4IYD, 216-433-5643.

## Glenn technical awards

Continued from page 7

has enabled Ansari to expand the scope of the probe applied to total health diagnostics using the eye as a "window to the body." This technology has been patented and is now being aimed at monitoring the health of the astronauts remotely via a helmet-mounted device connected to the Web.

Ansari's success has moved NASA Administrator Sean O'Keefe to note the invention as an "example of how we are using human spaceflight research to do exactly what NASA's vision compels us to do—improve life here." ♦

## In Memory

**Charles Calire**, 79, who retired from Glenn with 28 years of service, recently died. He retired in 1982 as fire chief in Plant Protection.

**Robert King**, 80, who retired in 1988 as a chemical engineer with 26 years of service, recently died.

**Robert Miller**, 71, who retired from Glenn with 31 years of service, recently died. Miller was a nationally recognized expert in spacecraft design who was instrumental in the success of more than 80 space missions. He retired in 1994 as an aerospace engineer.

## In Appreciation

I would like to thank everyone who donated leave to assist in my recovery after my surgery. It is a blessing to work with such wonderful individuals here at Glenn.  
—Kathy Clark

Thank you to all our friends for their prayers and support during my mother's recent illness and following her death. Thank you also for the beautiful flowers and donations of charity. They were a great comfort to us during a difficult time.

—Tom Griffin and family

## Behind the Badge

### a closer look at our colleagues

#### Dongming Zhu



**Job assignment:** I am a materials engineer with the Army Research Laboratory in the Environmental Durability Branch, Materials Division. My main job responsibility has been in the area of developing high-temperature ceramic coatings for gas turbine engine applications.

**Time at NASA:** 7 years and 3 months.

**Hometown/current residence:** I was born and raised in China and came to the United States in 1989 to pursue my Ph.D. at the University of Minnesota, starting in 1990. I have resided in since March 1996.

**Describe your family:** My wife, Huixiang, graduated last year with a master's degree in Computer and Information Science. She currently works as a computer database programmer in a healthcare company. Shirley, is a 9-year-old

**Career alternative:** A professor in engineering or perhaps an elementary school teacher

**Favorite food:** Chinese and American, vegetables (salads) and seafood, in particular.

**Favorite music:** Classical and soft rock

**Favorite Web site:** Yahoo.com

**Favorite book or magazine:** Biographies and news magazines

**Favorite movie or play:** *Schindler's List* directed by Steven Spielberg.

**Person you most admire:** Wright Brothers

**Activities when away from NASA:** I like photography, cooking, and gardening. But most of my spare time now is involved with Shirley's activities.

**What do you see as an area of expertise to be proud of at NASA?**

I highly regard the diverse backgrounds of the NASA workforce, their can-do spirits, and extraordinary talents. I am very impressed with NASA's unparalleled research environment and proud of its strong reputation in materials and propulsion technologies.

# IFMP Budget Formulation 101

What is Budget Formulation? How does it work? These are a few of the questions the Glenn community has been asking about the next Integrated Financial Management Program (IFMP) module scheduled for implementation.

The Budget Formulation module will utilize SAP's Strategic Enterprise Management (SEM) module to support budget development, internal and external reporting, as well as full-cost budgeting and management.

The Core Financial and Budget Formulation modules will form the Agency solution for financial planning, management, and execution. Both modules will allow integrated access to financial, procurement, and budget information across centers and programs.

The Budget Formulation module will have both bottom-up and top-down

budget planning functionality. The bottom-up functionality will enable formulation of institutional, program, enterprise, and Agency-level budget formulation requirements while the top-down functionality will support guideline release, Agency-level changes, and an Office of Management and Budget (OMB) interface. In short, the module will provide a tool set to facilitate full-cost budget development, including workforce planning, service pool planning, project planning, and general and administrative (G&A) planning;

Center, phased operating planning (POP) and phasing plan submission; NASA budget aggregation and submission; and budget pass-back process with the OMB and Congress.

At Glenn, the Resource Analysis and Management Office is working in conjunction with budgeting specialists from across the Center to implement Budget Formulation. There are process teams focusing on each of four functional areas: Service Pool, Project, G&A, and Workforce. These teams meet every other week to discuss process issues and new developments with the system.



Look for the latest updates at <http://cfo.grc.nasa.gov/ifm/budget.asp> and join us for the second annual IFMP Expo currently scheduled for August 27. ♦

National Aeronautics and  
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